Climate Pollution Reduction Grants: GHG Inventory 101 for MSAs

June 7, 2023

Welcome

Housekeeping Notes:

- Mics are automatically muted for all registrants and all cameras should be turned off.
- Links to additional resources will be provided in the Chat during the presentations.
- Please enter all questions in the Q&A tab at the TOP of the screen. Questions will be answered during the Q&A session (*Reserved for Grantees*).
- We encourage you to answer the poll questions which will pop-up periodically throughout the training (*Reserved for Grantees*).
- Slides will be shared after the training.
- A recording will be posted to the website for those who were unable to attend.

Disclaimer

The information contained in this presentation is intended for the sole purpose of providing technical assistance to planning grant recipients under EPA's Climate Pollution Reduction Grants (CPRG) program. The presentation describes legally binding requirements that govern the use and management of CPRG resources. This presentation does not substitute for binding requirements, and does not expressly or implicitly create, expand, or limit any legal rights, obligations, responsibilities, expectations, or benefits to any person.

In the event of a conflict between the discussion in this presentation and any legally binding requirement, this presentation document would not be controlling. Specific questions on how this information relates to a particular grantee's deliverables should be directed to that grantee's EPA Project Officer.

CPRG Inventory 101 Training

- CPRG GHG Inventory Requirements for MSAs
- GHG Inventory 101
  - What is an Inventory
  - What to Include
  - Estimation Methods
  - Selecting Base Years
  - Adapting Existing Inventories for CPRG
- Tools and Resources
  - EPA's Local GHG Inventory Tool
  - National Emissions Inventory
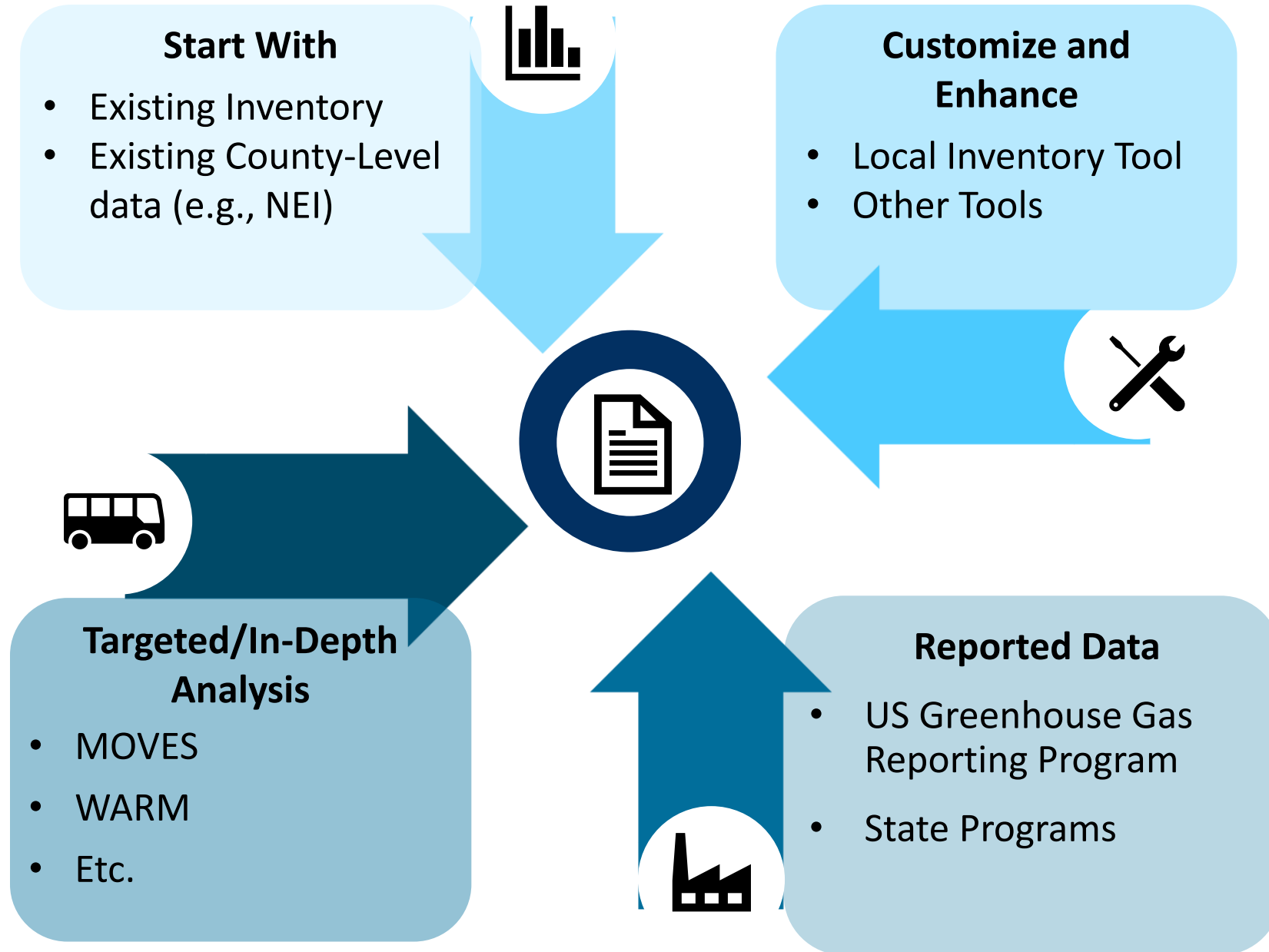 - Sector Specific Approaches

CPRG Requirements

CPRG Requirements – GHG Inventory

Priority Climate Action Plan (PCAP) Due: March 1, 2024	Comprehensive Climate Action Plan (CCAP) Due: 2 years from award (summer-fall 2025)	Status Report Due: 4 years from award (2027)
Simplified inventory. Using existing data, including from previously published inventories, or data from EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks by State, US GHG Reporting Program, or National Emissions Inventory is acceptable.	A comprehensive inventory must include all GHG emissions and sinks by emission source and sink category following commonly accepted protocols for the following sectors: industry, electricity generation and/or use, transportation, commercial and residential buildings, agriculture, natural and working lands, and waste and materials management.	As part of its Status Report, state and metropolitan area planning grant recipients are encouraged to provide an update of the comprehensive GHG inventory included in their CCAP

EPA is not requiring a specific base year; inventory years should be chosen based on availability of underlying data and to support development of GHG targets.

FITTING THE TOOLS TOGETHER

Start With
- Existing Inventory
- Existing County-Level data (e.g., NEI)

Customize and Enhance
- Local Inventory Tool
- Other Tools

Targeted/In-Depth Analysis
- MOVES
- WARM
- Etc.

Reported Data
- US Greenhouse Gas Reporting Program
- State Programs

CPRG Requirements – GHG Emissions Projections

Priority Climate Action Plan (PCAP) Due: March 1, 2024	Comprehensive Climate Action Plan (CCAP) Due: 2 years from award (summer-fall 2025)	Status Report Due: 4 years from award (2027)
Not Required	Near-term (e.g., 2030-2035) and long-term (e.g., 2050) projections of GHG emissions are required to be included in the CCAP. This element includes projections of GHG emissions (and sinks, if feasible) in the absence of plan measures (e.g., a "business-as-usual" projection), and a projection of GHG emissions under a scenario where the plan is fully implemented. The inclusion of sector-based projections is strongly recommended (e.g., establishing a separate GHG emissions projection for transportation, electricity generation, commercial and residential buildings, industry, agriculture, and waste and materials management). Grant recipients with existing GHG projections may use those projections, but are encouraged to update, modify, or expand those projections for the CCAP as appropriate.	Strongly encouraged to update their projected GHG emissions for the Status Report, if new information warrants it

GHG Inventory 101

What is a GHG Inventory?

- A greenhouse gas inventory is a historical accounting of the amount of greenhouse gases emitted to, or removed from, the atmosphere over a specific historical period of time (e.g., one year) from all various activities across the economy

- A state-level GHG inventory documents the activities that cause GHG emissions and removals within the state

- GHGs are emitted and sequestered from a variety of categories, and the magnitude of emissions and/or sinks for each category varies state, depending on economic and other state circumstances

What Should be Included

- Comprehensive or economy-wide [anthropogenic] estimates *[PCAP may be streamlined]*

- Cover primary GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, and NF_3)

- Developing a time-series can be useful for tracking trends and progress toward goals

- Report in CO_2 equivalent units to facilitate comparison of gases and aggregation of emissions and sinks
    - EPA GHG data uses 100-year GWPs from IPCC Fifth Assessment Report (AR5) per international reporting standards

- Consider how best to include direct vs. indirect emissions

What are Direct and Indirect Emissions?

- Direct Emissions (aka scope 1)
  - Emissions that are released from activities within the inventory boundary
    - Fossil fuel combustion
    - Fertilizer application
    - Landfill operation

- Indirect Emissions (aka scope 2 and 3)
  - Emissions that occur outside the boundary because of activity or demand within the boundary
    - Purchased electricity (scope 2)
    - Off-site waste disposal
    - Lifecycle related emissions

- Typically, community inventories are oriented around authority and ability to impact emissions
  - e.g. include direct emissions from a municipally-owned power plant; but not from a private power plant within your boundaries that you don't control (include indirect emissions from purchased power)

Electricity Related Emissions (Scope 2)

- Regional vs Utility Emissions Factors
  - Standard practice: use a regional (eGRID region) emissions factor in order to account for the workings of the electricity market
  - In some cases, utilities publish a utility specific emissions factor that accounts for their generation, sales, and purchases of electricity

- Renewable Energy Purchases
  - Location-based method does not account for contractual agreements to buy green power/RECS
    - already part of the regional grid factor so this would be double counting
    - Location-based method is required by most reporting protocols
  - Market-based method allows entities to account for contractual purchases of renewables and can be reported along with the location-based total

Estimation Methods

- Several approaches, and choice depends on availability of data and nature of source/sink determines method to ensure transparent, representative emissions, for example:
  - Emissions Factor (EF) *activity data (AD)
    - e.g., emissions = (emissions/unit of fuel consumption)* fuel consumption
  - Aggregation of facility level or site-specific emissions data
    - e.g., use of annual GHGRP data for MSW landfills
  - Emissions modeling
    - useful for characterizing complex systems with multiple variable and time dependencies (e.g., Agricultural Soil Management, use of ODS substitutes)
- Based on widely accepted methodological frameworks

Selecting a Base Year

- CPRG Guidance does not specify a base year to use

- Considerations

  - Do your member municipalities have goals or targets that specify base years?
  - Do significant programs and policies that reduce emissions include base years?
  - Are there anomalies present in the base year (uncharacteristically high or low emissions)?
  - Will a base year provide needed information to evaluate GHG measures?
  - Will the base year be compatible with base years being used elsewhere?
  - Is the data available?

    Choose a base year that is realistic and meets your specific needs

Adapting Existing Inventories for CPRG

- Using or supplementing existing inventory reports is a good start to your PCAP
- Considerations for incorporating existing inventories for the PCAP
    - How to reconcile differences between existing inventories; e.g.
        - different base years
        - different levels of detail (ie municipal level vs. county-level for different areas)
        - inclusion of different sectors/sources
        - equivalent numbers (ie, sectors, gases, GWPs)
        - Potential double counting between direct and indirect emissions
    - Whether existing inventories are representative of the larger MSA (land use, transportation patterns, building stock, etc) when building on or extrapolating from existing inventory reports
    - How can existing federal data sets or downscaled data fill gaps

Tools and Resources

EPA's Local GHG Inventory Tool

- Excel based

- Divided into 2 modules, can be used independently
  - Government Operations Module (not required for CPRG)
  - Community-Wide Module

- Designed to be flexible to the needs and constraints of different governments
  - data can be entered at any scale: municipal, county, or MSA-wide
  - default emissions factors are provided, but can be over-written with location-specific factors
  - customize year of inventory

- Access the tool and a recorded training: https://www.epa.gov/statelocalenergy/local-greenhouse-gas-inventory-tool

U.S. Environmental Protection Agency

Community Module

- Based on *Global Protocol for Community-Scale GHG Emissions,* version 0.9

- Covers nine sectors of community-scale emissions:
    - Stationary Fossil Fuel Combustion
    - Mobile Fossil Fuel Combustion
    - Solid Waste Management
    - Wastewater Treatment

      Scope 1
    - Electricity Consumption   Scope 2
    - Agriculture & Land Management
    - Forestry
    - Waste Generation (offsite disposal)
    - Water Use (offsite supply/treatment)
    - Additional Sources

      Scope 3

Planned Updates and Resources
- June: updated electricity emissions factors and GWPs
- June/July: guidance on accessing and using federal data; data template tool
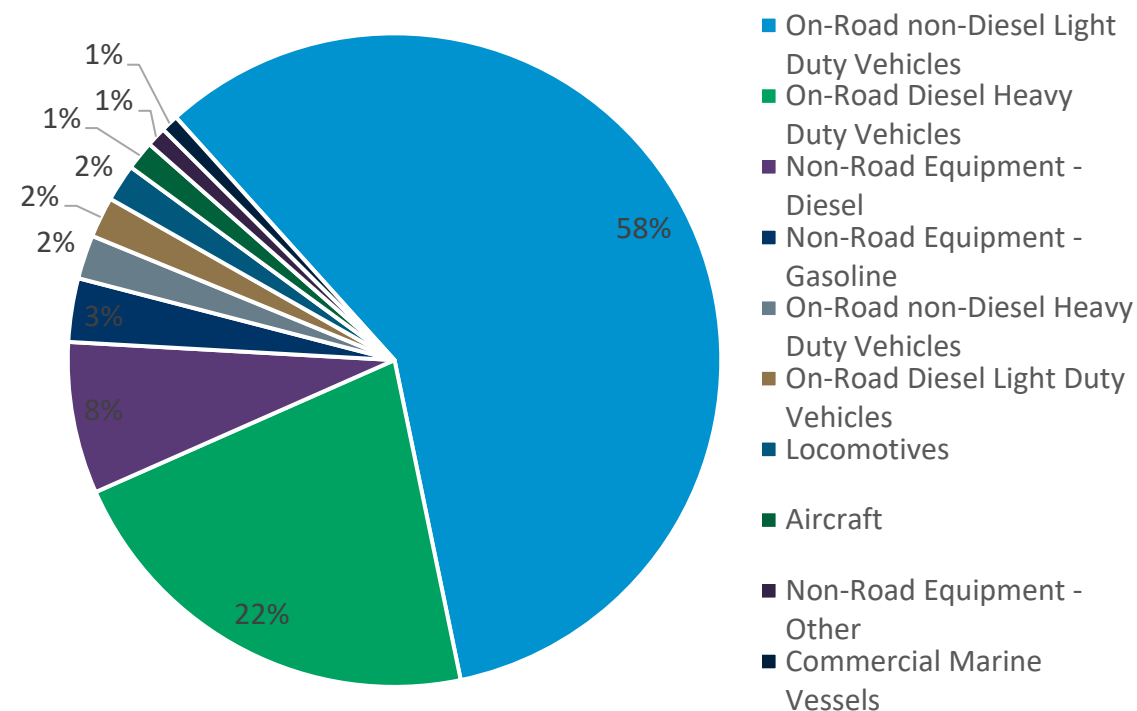- July/August: Quick Start guide and Tips for Regional Inventories

EPA's National Emissions Inventory (NEI)

- Nationwide compilation of criteria air pollutants (CAPs), precursors to CAPs, and hazardous air pollutants (HAPs) emissions estimates. <u>In addition, the NEI houses GHG emissions for select sectors</u>.
  - County- and facility-level data can be filtered and extracted using the [2020 NEI Data Retrieval Tool](#).

- GHGs in the 2020 NEI include:
  - Facility totals for select point sources from the GHGRP (CO_2, CH_4, N_2O, SF_6).
  - Facility totals from state, locality, and tribal submissions.
  - CO_2 from airports and CO_2, CH_4, and N_2O from railyards.
  - Mobile source GHGs by county/process:
    - Onroad and nonroad from MOVES (CO_2, CH_4; Onroad includes N_2O).
    - Locomotives (CO_2, CH_4, N_2O) and Commercial Marine Vessels (CO_2).
  - Wildfires and prescribed burning by county (CO_2, CH_4).

Sector-Specific Emissions Inventories

- Developing a detailed, sector-specific GHG emissions inventory may be useful for developing sector GHG projections.

- Additional detail in sector-based inventories can help identify targeted reduction measures.

- For example, a transportation sector inventory that identifies sub-sector emissions makes it easy to see which sub-sectors to prioritize.

Example Transportation Sector CO_2 Inventory to Target Reduction Measures

- On-Road non-Diesel Light Duty Vehicles
- On-Road Diesel Heavy Duty Vehicles
- Non-Road Equipment - Diesel
- Non-Road Equipment - Gasoline
- On-Road non-Diesel Heavy Duty Vehicles
- On-Road Diesel Light Duty Vehicles
- Locomotives
- Aircraft
- Non-Road Equipment - Other
- Commercial Marine Vessels

Pie chart values: 58%, 22%, 8%, 3%, 2%, 2%, 2%, 1%, 1%, 1%

MOVES : Detailed Transportation Sector Modeling

Motor Vehicle Emission Simulator

- The MOtor Vehicle Emission Simulator (MOVES) is EPA's state-of-the-science emission modeling system that can model GHGs, criteria air pollutants, and air toxics for both onroad vehicles (cars, trucks, buses, etc.) and some nonroad vehicles and equipment (e.g., construction equipment)

  - Some state, local air quality and transportation planning agencies are already familiar with MOVES

- Can be used to develop detailed transportation sector GHG inventories for current and previous years as well as GHG projections for future years through 2060

- MOVES combines the latest data on emission rates for various vehicle/equipment and fuel types, vehicle/equipment populations and activity information, and emissions controls

- MOVES will produce an inventory of vehicle fleet emissions based on this information, once the user defines the desired place, time, and vehicle or equipment types

Resources and Guidance

- EPA's MOVES website – download MOVES and find documentation
  - Current version is MOVES3
  - MOVES4 available later this year. Stay tuned!
    - Will account for two new major EPA rules - HD2027 and LD GHG 2023-2026.
    - Will include ability to model heavy-duty battery electric and fuel cell vehicles
- EPA's guidance for using MOVES to estimate state and local inventories of GHG emissions
- EPA's in-depth technical guidance for using MOVES
- EPA's MOVES training resources

Additional Methodologies and Tools

- [Local Action Framework: Develop a GHG Inventory](#)

- [Local Government Operations Protocol](#)

- [Global Protocol for Community Wide GHG Inventories](#)

- [CPRG Tools and Technical Assistance: GHG Inventories](#)

- [CPRG Tools and Technical Assistance: GHG Emissions Projections](#)

Develop Greenhouse Gas Inventory

Additional GHG Data Resources

- [Inventory of U.S. GHG Emissions and Sinks by State](#)

- [Facility Level Information on GreenHouse gases Tool (FLIGHT)](#)

- [EPA Emissions and Generation Integrated Database](#) (eGRID) and [Power Profiler](#)

- [State and Local Planning for Energy (SLOPE) Platform](#) (National Renewable Energy Lab)

GHGRP Data
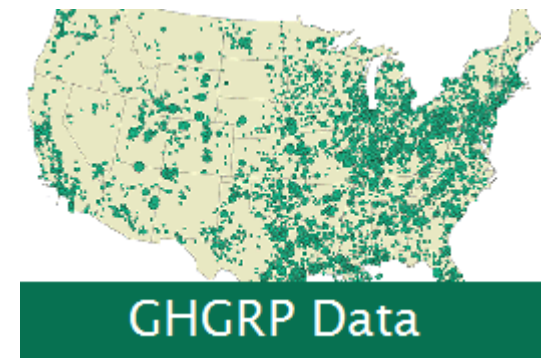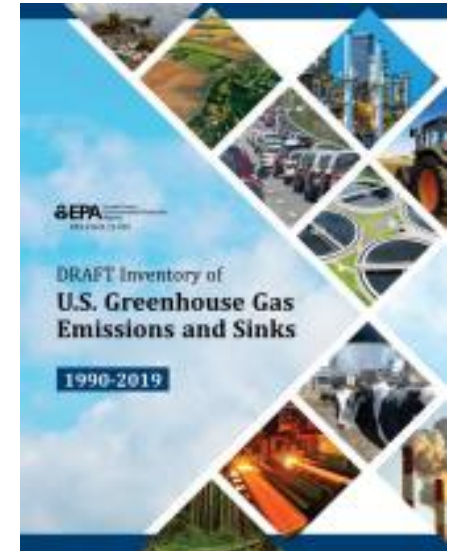
Upcoming Trainings

All trainings will be 1-1.5 hours from 2-4 pm ET:

- **June 28, 2-3 PM ET**: Interagency Coordination and Meaningful Engagement

- **July 19, 2-3:30 PM ET**: Co-Pollutant Inventory and Future Projections Benefits Analysis

- **Week of July 24**: Quantified GHG Reduction Measures

- **Week of July 31**: EPA Tools used for Evaluation and Quantification of Reduction Measures

- **Week of August 7**: Workforce Planning Analysis

- **Week of August 14**: Low Income/Disadvantaged Communities Benefits Analysis

- **Week of August 28**: Meaningful Engagement: Update and Technical Resources

Climate Innovation Teams (CITs)

- Opportunity for peer-to-peer technical assistance, collaboration, and mentoring, and sharing of case studies, best practices, and lessons learned

- Teams will be created based on workplan elements, EPA tools, key CPRG sectors, and grantee needs

- Led by EPA subject matter experts

- CITs will be launched late summer/early fall via Teams